

CLAIMS

1. An ink supply device, which includes an ink tank for containing ink therein and a tank holder for holding the ink tank in a detachable manner, wherein

the tank holder includes pressure control means for allowing the ink and air to circulate between the tank holder and the ink tank so that an internal pressure of the attached ink tank has a predetermined value.

2. The ink supply device as set forth in Claim 1, wherein

the pressure control means includes a pressure control chamber for storing the ink and the air that has flowed out from inside of the ink tank.

3. The ink supply device as set forth in Claim 1, wherein

the pressure control means includes air supply means for supplying the air into the inside of the ink tank from outside.

4. The ink supply device as set forth in Claim 1, wherein

a part of the pressure control means is inserted into the ink tank when the ink tank is attached to the tank

holder.

5. The ink supply device as set forth in Claim 1, wherein:

the tank holder includes first ink supply means in communication with the attached ink tank, for supplying the ink contained in the ink tank to outside; and

the first ink supply means is caused to be in communication with the ink tank last, when the ink tank is being attached to the tank holder.

6. The ink supply device as set forth in Claim 1, wherein:

the tank holder includes first ink supply means in communication with the ink tank attached, for supplying the ink contained in the ink tank to outside; and

the first ink supply means has communication with the ink tank disengaged first when the ink tank is detached from the tank holder.

7. The ink supply device as set forth in Claim 1 wherein

the ink tank contains therein only the ink and the air.

8. The ink supply device as set forth in Claim 2

wherein

the pressure control chamber includes at least a part of a side surface made of a biasing member, which biases another surface so that the capacity of the pressure control chamber becomes larger.

9. The ink supply device as set forth in Claim 1 wherein

the pressure control means is provided near a bottom surface of the ink tank.

10. The ink supply device as set forth in Claim 2 wherein

the pressure control chamber includes an ink absorber which has absorbed the ink beforehand.

11. The ink supply device as set forth in claim 1 wherein

the pressure control means includes negative pressure control means for controlling the internal pressure of the ink tank so as to be negative.

12. The ink supply device as set forth in Claim 2 wherein

capacities V_s and V_t satisfy the following formula:

$$0.1 \leq V_s / V_t \leq 0.3$$

where V_t is the capacity of the ink tank and V_s is the capacity of the pressure control chamber.

13. An ink supply device, which includes an ink tank for containing at least ink therein, comprising

capacity changing means for changing a capacity of the ink tank, according to a change in a state of a content inside the ink tank due to an environmental change outside the ink tank.

14. An ink supply device, which includes an ink tank for containing at least ink therein, comprising

pressure change control means for controlling a change in pressure, caused by consumption of the ink, inside the ink tank by supplying air to the inside of the ink tank from outside of the ink tank.

15. The ink supply device as set forth in Claim 13, comprising

pressure change control means for controlling a change in pressure, caused by consumption of the ink, inside the ink tank by supplying air to the inside of the ink tank from outside of the ink tank.

16. The ink supply device as set forth in Claim 15, wherein:

the ink tank includes a first opening section and a second opening section; and

the capacity changing means and the pressure change control means are provided so as to respectively cover the first opening section and the second opening section.

17. The ink supply device as set forth in Claim 16 wherein:

the ink tank includes a third opening section for supplying the ink contained in the ink tank to the outside; and

only the third opening section and the pressure change control means is in communication with the outside of the ink tank.

18. The ink supply device as set forth in any one of Claims 15 through 17, wherein

the capacity changing means is made of an elastic member.

19. The ink supply device as set forth in any one of Claims 15 through 18, wherein

the capacity changing means changes the ink tank capacity by equal to or more than ten percent with respect to a pressure change per 1kPa inside the ink tank.

20. The ink supply device as set forth in any one of Claims 15 through 19, wherein

the capacity changing means is arranged to generate a negative pressure inside the ink tank when the use of the ink supply device starts.

21. The ink supply device as set forth in any one of Claims 15 through 20, wherein

the pressure change control means controls the pressure change inside the ink tank by using the surface tension of the ink on a boundary face between the pressure change control means and the ink inside the ink tank.

22. The ink supply device as set forth in any one of Claims 15 through 21, wherein

the pressure change control means is made of a filter.

23. The ink supply device as set forth in Claim 22, wherein

a mesh radius of the filter is between 25 μ m to 50 μ m.

24. The ink supply device as set forth in Claim 17, comprising:

second ink supply means being provided to a third opening section so as to cover the third opening section,

the second ink supply means providing the ink to the outside in a case where the pressure outside the ink tank is equal to or less than a predetermined value.

25. The ink supply device as set forth in Claim 24 wherein:

the second ink supply means is made of a filter; and

the mesh radius of the filter is between 25 μ m to 50 μ m.

26. The ink supply device as set forth in any one of Claims 22, 23, and 25, wherein

surfaces of the filter are caused to be hydrophilic.

27. The ink supply device as set forth in any one of Claims 15 through 26, wherein

the capacity changing means is provided so that (i) a direction, in which the capacity changing means moves in order to change the capacity, and (ii) a direction, in which the ink supply device moves when the ink supply device is attached to a printing device and used, differ from each other.

28. The ink supply device as set forth in Claim 16 or

17, wherein

the second opening section is provided at a bottom surface of the ink tank.

29. The ink supply device as set forth in Claim 24 wherein:

the third opening section is provided at a bottom surface of the ink tank; and

the second opening section and the third opening section are provided at a substantially same height.

30. The ink supply device as set forth in any one of Claims 15 through 29, wherein

the capacity changing means is provided inside the ink supply device.

31. The ink supply device as set forth in Claim 16 or 17, wherein

the first opening section is provided at an upper surface of the ink tank.

32. The ink supply device as set forth in Claim 28 or 29, wherein

the first opening section is provided at a bottom surface of the ink tank.

33. The ink supply device as set forth in any one of Claims 13 through 32, wherein

inside the ink tank, only the ink and the air is contained.